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Briggs and stratton intek 18 hp manual

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Page 7 Drill Size − Decimal Equivalent In Inches .040 .0995 .161 .228 .332 .041 .1015 .166 .234 .339 .042 .104 .1695 15/64 .2344 11/32 .3438 .043 .1065 11/64 .1719 .238 .348 .0465 .1094 .173 .242 .358 7/64 .052 .110 .177 .246 23/64 .3594 .055 .111... Page 8 Section 1 GENERAL INFORMATION Section Contents Page IN THE INTEREST OF SAFETY .....BRIGGS &... In the Interest of Safety You are not ready to operate this engine if you This safety alert symbol indicates that this have not read and understood the following message involves personal safety. Words safety items. Read this entire owner's manual danger, warning and caution indicate degree of operating instructions... Page 10 BRIGGS & STRATTON NUMERICAL NUMBER SYSTEM All Briggs & Stratton engines have a unique numerical designation system. Each engine is identified by a Model, Type and Code number. Example: Model Type Code 405777 0125 01 99052115 This chart explains the numerical model designation system. It is possible to determine most of the important mechanical features of the engine by merely knowing the model number. MAINTENANCE 5 Hours 25 Hours or 50 Hours or 100 Hours or Maintenance Schedule or Daily Every Season Every Season Every Season Hours Check oil level♦ Change oil D Note 1 Change oil filter D Note 1 Change air cleaner pre-cleaner D Note 2 Change air cleaner cartridge D Note 2... IMPORTANT: DO NOT OVERFILL. Check and maintain CLEAN oil level regularly. Change oil after first eight (8) hours of ROTATING SCREEN operation. Thereafter, change oil every fifty (50) hours of operation. Change oil more often if engine is operated in dirty or dusty conditions or if engine is operated under heavy loads or in BLOWER HOUSING... Air Cleaner Maintenance KNOBS WARNING: NEVER operate engine with air clean- er assembly or air cleaner cartridge removed. fire may result. COVER A properly serviced air cleaner protects internal parts of the engine from dirt and dust particles in the air. If air cleaner CARTRIDGE instructions are not carefully followed, dirt and dust, will be drawn into the engine. If the engine will not start and the cause of malfunction is Check Ignition not readily apparent, perform a systematic check in the (Engine Running) following order: If engine runs but misses during operation, a quick check to determine if ignition is or is not at fault can be made by 1. Check Carburetion If compression is poor, look for − Before making a carburetion check, be sure the fuel tank Loose cylinder head bolts has an ample supply of fresh, clean gasoline. Be sure that the shutoff valve, if equipped, is open and fuel flows freely Blown head gasket through the fuel line before starting engine. be no RPM loss. When the other cylinder is grounded out SPARK PLUG LEAD the engine will stop. NOTE: A twin cylinder engine will run well on one cylinder as long as the power required for the application does not exceed the power produced by the one cylinder. Fastener Specifications Description Wrench/Socket Size Torque Alternator (stator) ..... . 1/4" ..... 20 in. Common Specifications Model Series Bore Stroke Displacement 405777 ....2.970" (75.44 mm) ..2.890" (73.40 mm) ... 40.0 cu. Page 19 Section 2 IGNITION Section Contents Page SPECIFICATIONS ..... GENERAL INFORMATION . Removing Armatures 1. Remove spark plug leads and spark plugs. 2. Remove rotating screen and blower housing. 3. Remove armature screws and lift off armature(s), Fig. 1. a. Disconnect stop switch wires at armatures. Note: The flywheel does not need to be removed to service MAGNETRON®... 4. Reinstall flywheel nut. Turn nut down flush with top of threads. #19203 FLYWHEEL PULLER 5. Install flywheel puller, Tool #19203. 6. Tighten puller screws equally until flywheel loosens, Fig. 5. DO NOT strike flywheel with a hard object or a metal tool as this may cause flywheel to shatter in operation. ENGINE WIRING HARNESS The engine wiring harness consists of a ground wire with a GROUND EYELET diode for each armature and a separate wire for the carburetor solenoid, Fig. 9. The engine wiring harness is SOLENOID connected to the wiring harness provided by the equipment CONNECTOR manufacturer. ENGINE WIRING HARNESS DIAGRAM GROUND WIRE HARNESS CARBURETOR SOLENOID DIODE DIODE ENGINE HARNESS ENGINE HARNESS CONNECTOR RAISED RIB ON CONNECTOR INDICATES EQUIPMENT HARNESS CONNECTOR GROUND SIDE EQUIPMENT SWITCH DIODE FAILURE DIAGNOSIS SWITCH ON SWITCH OFF CAUSE Engine Runs Shuts Off OK 1 Closed Diode On 1 Cylinder Only One Cylinder... Page 24 Section 3 Carburetion Section Contents Page GENERAL INFORMATION .....REMOVE INTAKE MANIFOLD AND CARBURETOR . SEE SECTION 1 FOR AIR CLEANER MAINTENANCE PROCEDURES. GENERAL INFORMATION The Intek™ OHV V-twin utilizes a fixed jet, two barrel, side draft, flo-jet carburetor. Except for idle speed, the carburetor is non-adjustable. The carburetor incorporates a fuel shut off solenoid which controls fuel flow to the fuel metering system. The solenoid is controlled by the ignition switch. DISASSEMBLE CARBURETOR 1. Remove two screws and float bowl. a. Discard O-ring. FLOAT BOWL Fig. 4 − Remove Float Bowl 2. Disassemble fuel solenoid from float bowl. Discard gas- ket. MAIN JET a. Use 1/2" thin profile wrench and carburetor socket, HOUSING MAIN JET Tool #19458 (14 mm) or 19459 (16 mm). 5. Remove screws and choke plate. a. Remove choke shaft. Discard seal. CHOKE PLATE SEAL Fig. 8 − Remove Choke Shaft 6. Remove nozzle body. Discard gasket. NOZZLE BODY GASKET Fig. 9 − Remove Nozzle Body 7. Mark throttle plates before removing so that they may be re-installed in the same position. Check Throttle, Choke Shaft And Body For Wear 1. Lay carburetor on flat surface and check throttle and choke shaft clearance as shown in Fig. 11. Throttle shaft and choke shaft clearance must not exceed .010" (.25 mm). Fig. 11 − Checking Clearance 2. Page 29 3. Install nozzle body with new gasket. NOZZLE a. Tighten screw securely. BODY GASKET Fig. 15 − Install Nozzle Body 4. Assemble new seal to choke shaft and insert into carbu- CHOKE retor body. PLATE a. Install choke plate. Note: Use LOCTITE® 222 on screw threads. SEAL Fig. 7. Install fixed main jet, according to engine model. Main Jet Identification MAIN JET Model 405770 No. 132 HOUSING MAIN JET Model 445770 No. 140 405770 #132 445770 #140 8. Assemble fuel solenoid to float bowl and main jet hous- ing. 4. Connect fuel line to carburetor.Install clamp with tabs facing to sides or down. TABS TO 5. Install blower housing. SIDE OR a. Torque screws to 80 in. lbs. (9.0 Nm). DOWN 6. Install rotating screen. a. Torque screws to 20 in. lbs. (2.0 Nm). Assemble air cleaner. Governed Idle Adjustment Perform adjustments exactly in order shown. 1. Move equipment control lever to SLOW position. 2. Hold throttle lever against idle speed adjustment screw IDLE SPEED and adjust idle speed to 1200 RPM, Fig. 26. Release SCREW throttle lever. CARBURETOR THROTTLE LEVER... FUEL SHUT OFF SOLENOID The fuel shut off solenoid is controlled by the equipment ignition switch. When the equipment switch is in the "Off" position, the solenoid valve plunger closes, stopping fuel flow through the fixed main jet. When the switch is in the "On" and "Start" position, the solenoid valve opens, allowing normal fuel flow. FUEL PUMP The fuel pump, mounted on the No. 1 cylinder shield, allows remote fuel tank installations. The fuel pump will prime at 12" (30.5 cm) maximum lift. Fuel pump pressure is 1.5 psi (0.1 Bar). The pump is operated by pulsating crankcase vacuum from the engine. Page 35 Section 4 GOV. CONTROLS & GOVERNOR Section Contents Page GENERAL INFORMATION .....REMOTE GOVERNOR CONTROLS Speed Regulation . Governed Idle Intek™ OHV Twin cylinder engines have a governed idle system. A throttle restrictor permits the engine to maintain THROTTLE RESTRICTOR engine speed when a light load is applied with the equipment control in the SLOW position, Fig. 2. GOVERNED IDLE SPRING Fig. GOVERNOR Disassemble Drain oil and remove engine from equipment. Remove spark plugs. Remove valve covers, depress springs and remove push rods. Mark push rods so that they may be reassembled in their original position. If push rods are mixed, it may be necessary to readjust valve clearances. Note: Intake push rods are aluminum. 5. The following tools are required to remove the governor shaft bushing, Fig. 10. a. 3/8" drive 5/8" socket. b. 1/4" flat washer. c. 1/4 − 20 screw and nut from #19165 flywheel pull- d. #94349 flat washer. Fig. 10 − Bushing Removal Tools Assemble tools as shown. Reassemble 1. Lubricate thrust washer, governor gear and governor cup with engine oil and assemble to shaft, Fig. 14. GOVERNOR GEAR Fig. 14 − Install Governor Gear 2. Install sump with new gasket, Fig. 15. a. Torque screws in sequence shown to 200 in. lbs. (23.0 Nm). 5. Install push rods in their original positions. a. Compress valve springs and insert push rods into recess in rocker arm adjustment screws, Fig. 18. Note: Intake push rods are aluminum. Fig. 18 − Install Push Rods Install valve covers with new gaskets, Fig. 19. a. Governed Idle Adjustment Perform adjustments exactly in order shown. 1. Move equipment control lever to SLOW position. 2. Hold throttle lever against idle speed adjustment IDLE SPEED screw and adjust idle speed to 1200 RPM, Fig. 22. Re- SCREW lease throttle lever. CARBURETOR THROTTLE LEVER... Section 5 Cylinder Head and Valves Section Contents Page REMOVE CYLINDER HEAD ..... . DISASSEMBLE CYLINDER HEAD . Page 43 REMOVE CYLINDER HEADS Disconnect exhaust system from cylinder heads and disconnect choke and throttle control cables. 1. Remove the following parts from engine, Fig. 1: a. Air cleaner cover, cartridge and pre-cleaner. b. Rotating screen. c. Blower housing. d. Spark plugs. Fig. 6. Remove No. 2 cylinder shield. 1/4-20 SCREW #10-24 SCREW Fig. 5 − Remove Cylinder Shield 7. Remove valve covers and discard gaskets. Fig. 6 − Remove Valve Covers 8. Remove rocker arms and push rods, Fig. 7. Note: Mark push rods so that they may be reassembled in their original position. DISASSEMBLE CYLINDER HEAD 1. Cylinder Head 2. Cylinder Head Gasket 3. Valve Spring Retainer Locks 4. Valve Spring Retainer 5. Valve Spring 6. Valve 7. Intake Valve Stem Seal 8. Valve Guide Fig. 9 − Cylinder Head Components 1. Remove valves, Fig. 10. Note: Place a shop rag or short section of rubber fuel line under valves inside combustion chamber to hold valve in place while compressing spring. Page 46 INSPECT AND REPAIR 1. Check cylinder head, Fig. 12. Be sure all gasket material is removed from surfaces STRAIGHT before checking. Use a gasket scraper if necessary. EDGE a. Inspect cylinder head for cracks or damage. b. Use a surface plate or straight edge and check cylinder head mounting surface for distortion. 5. Measure valve stem diameter at specified distance from end of valve, as shown in Fig. 16. Replace if less than .233" (5.92 mm). 1.600" (40 MM) Fig. 16 − Measure Valve Stem Diameter 1. Cylinder Head ASSEMBLE CYLINDER HEAD 2. Page 48 1. Use valve guide driver, Tool #19416 and install new in- VALVE STEM take valve stem seal. SEAL (CUTAWAY VIEW) a. Oil inner surface and lip of valve stem seal. b. Press seal on to valve guide bushing until it bot- toms, Fig. INSTALL CYLINDER HEAD 1. Place cylinder head gasket over alignment dowels on cylinder block, Fig. 22. ALIGNMENT DOWELS Fig. 22 − Install Cylinder Head Gasket 2. Install cylinder head assembly, Fig. 23. a. Torque head bolts in sequence shown to 220 in. lbs. 3. Install valve covers with new gaskets, Fig. 26. a. Torque screws to 100 in. lbs. (11.0 Nm) Fig. 26 − Install Valve Covers REASSEMBLE 1. Install No. 1 cylinder shield and fuel pump assembly, Fig. 27. 1/4-20 a. Torque 1/4-20 screw to 80 in. lbs. (7.0 Nm). SCREW b. 4. Install intake manifold and carburetor assembly, using new gaskets, Fig. 30. a. Assemble governor link to governor lever. b. Torque screws to 80 in. lbs. (9.0 Nm). c. Connect solenoid wire to solenoid. d. Connect breather tube to air horn. Note: Route armature ground wire between breather tube and air horn. Section 6 Electric Starters Section Contents Page GENERAL INFORMATION .....TROUBLESHOOTING . TROUBLESHOOTING The Digital Multimeter will withstand DC input of 10-20 Amps for up to 30 seconds. When checking current draw of NOTE: If a starting problem is encountered, the engine itself should be thoroughly checked to eliminate it as the 12 volt starter motors, the DC Shunt, Tool #19359, is cause of starting difficulty. Test Bracket DRILL TWO HOLES − 3/8" EXTRA HOLE A starter motor test bracket may be made as shown in (9.5 MM) DIA. FOR MOUNTING FOR MOUNTING STARTER Fig. 5. STARTER BRACKETS DRILL AND TAP TWO 2-1/4" A growler or armature tester is available from an Automobile HOLES (57.2 MM) FOR MOUNTING... Conditions Affecting Starter Motor Performance 1. A binding or seizing condition in the starter motor bear- ings. 2. A shorted, open or grounded armature. a. Shorted, armature (wire insulation worn and wires touching one another). Will be indicated by low or no RPM. Assemble Starter Drive RETAINER 1. Assemble clutch drive to starter shaft and rotate clutch CLUTCH until it drops into place, Fig. 9. DRIVE SPRING 2. Install pinion gear with beveled side of teeth up. Then WASHER install return spring making sure spring is in recess of RETURN starter gear. 3. Hold the armature and commutator end cap against a work surface while sliding housing off the armature, Fig. 12. NOTE: This allows the brush retainer to remain assembled HOLD ARMATURE to commutator for inspection of brush to commutator DOWN contact. 3. Hold armature and end cap against work surface. 4. Slide housing over armature, aligning notch in housing with terminal on brush retainer, Fig. 16. HOLD ARMATURE DOWN ALIGN NOTCH WITH TERMINAL Fig. 16 − Install Starter Housing 5. Assemble spring washer and thrust washer to armature shaft and install drive end cap, Fig. BATTERY INFORMATION The battery used to operate starter motors on Briggs & Stratton Twin Cylinder engines is 12 volt, lead acid, wet cell ANTI-AFTERFIRE STOP type. This type is available as a wet charge or dry charge ALTERNATOR SOLENOID SWITCH battery. DO NOT CRANK STARTER for more than 15 SECONDS CHECK ALL USE TEMPERATURE CELLS AFTER without allowing starter to COOL at least 2 MINUTES. The COMPENSATED CHARGING HYDROMETER starter motor could be damaged. Battery Recommendations These battery size recommendations are based on REPLACE IF READINGS ARE minimum temperature expected and correct weight of oil... Page 61 Section 7 ALTERNATORS Section Contents Page ALTERNATOR IDENTIFICATION .....FLYWHEEL IDENTIFICATION . Page 62 The alternator systems installed on Briggs & Stratton Intek™ OHV-Twin Cylinder Engines can easily be identified by the color of the stator output wires and the connector. Table No. 1 provides a means of identifying the various alternator systems. Note: All output figures are rated at 3600 RPM. TABLE NO. Page 63 BLACK LEAD AC OUTPUT RED LEAD CONNECTOR DC OUTPUT GREEN GREEN CONNECTOR CONNECTOR BLACK LEAD YELLOW WIRE STATOR STATOR ASSEMBLY DC CHARGING CIRCUIT ASSEMBLY RED LEAD WHITE CONNECTOR WHITE LEAD AC FOR LIGHTS • 3 amp DC unregulated for charging battery (ONE red lead from stator). STATOR ASSEMBLY RED CONNECTOR OUT- PUT LEAD ONE RED LEAD ALTERNATOR MAGNETS TWO BLACK LEADS YELLOW CONNECTOR REGULATOR TWO YELLOW RECTIFIER LEADS • 10 or 16 amp DC regulated for charging battery. • Two black leads from stator. Fig. 7 − Alternator Magnets •... The following list is provided to aid you in diagnosing problems with alternator systems. TROUBLESHOOTING COMPLAINT POSSIBLE CAUSES "Battery not charging" • Engine RPM too low. • Inline fuse "blown" (if equipped). • Defective battery. • Loose, pinched, or corroded battery ground leads. •... DC ONLY ALTERNATOR The DC alternator provides DC current for charging a 12 volt battery. The current from the alternator is unregulated and is rated at 3 amps. The output rises from 2 amps at 2400 RPM, to 3 amps at 3600 RPM. Recommended battery sizes range from 30 ampere hour for new art warm temperature service to 50 ampere hour in coldest... a. If meter "Beeps" once, diode is installed back- BLACK TEST RED TEST LEAD TO wards. Replace diode. LEAD POSITIVE DC OUTPUT PIN BATTERY b. If meter still displays "OL," diode is defective TERMINAL (open). Replace diode. 6. If diode tests OK, check stator for bare wires or other obvious defects. 6. If diode tests OK, check stator for bare wires or other NOTE: Some equipment manufacturers supply the diodes obvious defects. If grounded leads are not visible, re- as an integral part of the equipment wiring harness. place the stator. Some equipment manufacturers use a 1 OHM 20 WATT resistor placed in series with (+) DC charging lead, limiting the charging current to approximately 3 amps when the... 1. Insert RED test lead into receptacle in meter. 2. Insert BLACK test lead into receptacle in meter. 3. Rotate selector to (Diode Test) position. 4. Attach BLACK test lead clip to point "A," (red wire) Fig. 17. (It may be necessary to pierce wire with a pin as shown.) 5. * Depending upon battery voltage. For example, if the RED TEST LEAD TO AC OUTPUT PIN (GREEN CONNECTOR) battery voltage was below 11 volts, the output reading would be 5 or 9 amps, depending upon the alternator system being tested. If battery voltage is at its maximum, the amperage will be less. Test Regulator-Rectifier The DC Shunt must be installed on the negative (-) terminal of the battery, Fig. 23. All connections must be NOTE: The Digital Multimeter will withstand DC input of 10-20 amps for up to 30 seconds. When checking DC output clean and tight for correct amperage readings. Regulator-Rectifier With Charge Indicator DC charging output values and test procedures are the same as those listed for the 10 amp or 16 amp system. Regulator-rectifier Part #493219, Fig. 24, is used by some equipment manufacturers that have a charging indicator light instead of an ammeter. TYPICAL 16 AMP REGULATED ALTERNATOR WIRING DIAGRAM − 6 POLE SWITCH WITH CHARGE INDICATOR LIGHT ALTERNATOR ANTI-AFTERFIRE STOP SOLENOID SWITCH KEY SWITCH CHARGE INDICATOR LIGHT AC OUTPUT WIRES BLUE WIRE REGULATOR RECTIFIER RAISED RIB RED WIRE SOLENOID TAB DC OUTPUT TERMINAL BATTERY STARTER... Testing Charge Indicator BATTERIES It is important that the test procedure be done in a The battery is of the 12 volt, lead acid, wet cell type. This systematic manner to identify whether the problem is related type is available as a maintenance free or a dry charged to the regulator/rectifier or the charging indicator wiring battery. CHECK ALL CELLS AF- USE TEMPERATURE TER CHARGING COMPENSATED HYDROMETER ANTI-AFTERFIRE STOP ALTERNATOR SOLENOID SWITCH KEY SWITCH REPLACE IF READINGS ARE BELOW 1.225 OR IF CELLS VARY BY MORE THAN .50 OUTPUT WIRES DC OUTPUT WIRE REGULATOR RECTIFIER SOLENOID TAB Fig. Section 8 Lubrication System Section Contents Page DESCRIPTION .....CHANGE OIL . Page 77 DESCRIPTION Briggs & Stratton Intek™ OHV V-Twins use a full pressure lubrication system with an oil filter. The gear driven oil pump draws oil from a screened oil pickup in the sump and pumps the oil through the oil filter. The filtered oil flows through oil galleries in the sump and is distributed to the main bearings, connecting rod bearings and camshaft bearings. Page 78 OIL FILL TUBE AND DIPSTICK The oil fill tube and the dipstick are equipped with an "O"-ring for proper sealing, Fig. 4. ''O'' Note: a leak at the seal between the tube and sump, RING or at the seal at the upper end of the dipstick, can result in a loss of crankcase vacuum and a discharge of oil or smoke through the muffler. Page 79 CRANKCASE BREATHER The crankcase breather is equipped with a reed valve to REED VALVE control and maintain a partial vacuum in the crankcase. The breather is vented to the intake elbow. The breather chamber contains a removable oil vapor collector. Oil vapor is condensed on the collector material and drains back into the crankcase, which minimizes the Ñ... Page 80 DISASSEMBLE OIL PUMP Drain oil and remove oil filter. Remove engine from equippment. Remove spark plugs. The oil pump can be inspected or replaced without removing the sump. 1. Remove the following parts, Fig. 10. a. Remove oil pump cover b. Section 9 Engine Disassembly SCREEN BLOWER HOUSING BACKPLATE FLYWHEEL STARTER MOTOR ALTERNATOR ARMATURE STOP SWITCH WIRING HARNESS CYLINDER CYLINDER HEAD PUSH RODS CYLINDER HEAD PUSH RODS AIR GUIDE CONTROL BRACKET GOVERNOR LEVER 9905... Page 82 BREATHER CYLINDER ROD & PISTON ROD & PISTON CRANKSHAFT CAMSHAFT TAPPETS GOVERNOR SUMP SUMP OIL PUMP... Page 83 ENGINE DISASSEMBLY Drain oil, remove oil filter and remove engine from equipment. Remove spark plugs. Remove cylinder heads. See Section 5. Remove flywheel, disconnect stop switch wires at armatures and remove armatures. See Section 2. 1. Remove the following parts, Fig. 1. a. Page 84 Note: Remove any carbon or ridge at the top of cylinder bores to prevent breaking rings when removing piston and connecting rod assemblies. 5. Remove No. 2 connecting rod cap and push connecting rod and piston assembly out of cylinder. a. Page 85 Section 10 Cylinder And Crankcase Cover Inspection And Repair Page Section Contents CYLINDER Checking Cylinder .....Resizing . Note: If cylinder bores are within specification and show no signs of scoring or other damage, new piston rings may be installed providing the cylinder bores are reconditioned using a rigid hone with finishing stones, to restore the proper cross hatch angle in the cylinder bores. Cylinder Finish (Cross Hatch) The finishing stones are used after the cylinder bore has been resized to within.0015" (.04 mm) of the desired size or APPROXIMATELY 45° when reconditioning a cylinder bore. The finishing stones 45° will produce the correct cross hatch necessary for proper lubrication. Install Mag Bearing 1. Place cylinder on cylinder support, Tool #19227 with large opening facing bearing, Fig. 7. 2. Align oil hole in DU bearing with oil hole in cylinder. 3. Press in new bearing to correct depth with bushing driv- er, Tool #19226. Install PTO Oil Seal Always install new oil seals whenever engine is disas- sembled for major servicing. When installing new PTO oil seal, use cylinder support, Tool #19227 and press oil seal slightly below mounting surface. Always lubricate sealing lips with engine oil to prevent damaging seal when installing crankshaft. Page 90 Section 11 Crankshaft And Camshaft Section Contents Page Checking Crankshaft .....Checking Cam Shaft . Page 91 Section 12 Piston, Rings And Connecting Rod Inspection And Assembly Section Contents Page GENERAL INFORMATION .....DISASSEMBLE PISTON AND CONNECTING ROD . Page 92 2. Disassemble piston from connecting rod, Fig. 2. a. Remove piston pin locks. b. Piston pin is a slip fit in piston and connecting rods together as an assem- bly. Do not mix. Fig. 2 − Remove Piston Pin Locks CHECKING PISTON AND RINGS If the cylinder is not going to be resized and the piston shows no signs of scoring, the piston should be checked. Page 93 CHECKING PISTON PIN AND CONNECTING ROD 1. Check piston pin, Fig. 6. a. Replace if less than .6718" (17.06 mm) or .0005" (.01 mm) out of round. Fig. 6 − Check Piston Pin Check connecting rod bearings. CRANKPIN BEARING Note: If crankpin bearing is scored or worn the connecting rod must be replaced. ASSEMBLE PISTON RINGS TO PISTON Models 405700 1. Install piston rings using ring expander, Tool #19340, Fig. 10. a. Install oil ring coil expander making sure wire is in- serted fully into coil. b. Install oil ring. c. Install center compression ring then, top compres- CENTER sion ring. Page 95 Section 13 Engine Assembly Section Contents Page INSTALL CRANKSHAFT .....INSTALL PISTON AND CONNECTING ROD . INSTALL PISTON AND CONNECTING ROD Note: Install #1 piston and connecting rod first. PROJECTIONS 1. Oil piston rings, piston skirt, and compress rings with Ring Compressor Tool #19070, Fig. 2. a. Place piston and ring compressor upside down on bench with projections on compressor facing up. b. INSTALL SUMP Lubricate PTO and cam shaft bearing. 1. Install sump with new gasket. a. Torque screws in sequence shown to 200 in. lbs. (23.0 Nm), Fig. 6. 2. Check crankshaft end play. Specification: .002"-.030" (0.020-0.30 mm) Fig. 6 − Installing Crankcase Cover 3. 5. Install back plate. a. Torque screws to 100 in. lbs. (11.0 Nm). Note: Route armature ground wire under back plate and between starter motor mounting bosses on cylinder as shown, Fig. 10. Fig. 10 − Route Armature Ground Wire 6. ADJUST ARMATURE AIR GAP 1. Rotate flywheel until magnet is under armature lamina- tions. THICKNESS 2. Place thickness gauge, .008"-.012" (0.20-.30 mm) be- GAUGE tween magnet and armature laminations, Fig. 14. 3. Loosen mounting screw so magnet will pull armature down against thickness gauge. 3. Install valve covers with new gaskets, Fig. 18. a. Torque screws to 100 in. lbs. (11.0 Nm). Fig. 18 − Install Valve Covers INSTALL CYLINDER SHIELDS 1. Install No. 1 cylinder shield and fuel pump assembly, Fig. 19. a. Torque 1/4-20 screw to 80 in. lbs. (7.0 Nm) 1/4-20 SCREW b. INSTALL BLOWER HOUSING 1. Assemble blower housing to engine. a. Torque screws to 80 in. lbs. (9.0 Nm). 2. Install rotating screen. a. Torque screws to 20 in. lbs. (2.0 Nm). Assemble air cleaner and install spark plugs. Fig. 22 − Install Blower Housing ADJUST GOVERNOR CONTROL SWIVEL... Governed Idle Adjustment Perform adjustments exactly in order shown. 1. Move equipment control lever to SLOW position. 2. Hold throttle lever against idle speed adjustment screw IDLE SPEED and adjust idle speed to 1200 RPM, Fig. 25. Release SCREW throttle lever. CARBURETOR THROTTLE LEVER... More durable. More efficient. More powerful. Mows the lawn and lasts long. Keeps the engine clean by deflecting and ejecting grass and debris for a longer engine life. Provides a smoother ride and more comfort. No prime, no choke, no worries. Just pull for power. Gross Horsepower (ft-lbs)* 11.5 Engine Displacement (cc) 344 Engine Configuration Single cylinder, 4-stroke, air cooled, OHV (Overhead Valve) Fuel Tank Capacity (gal) 2.6 (optional) Cylinder Type Cast Iron Sleeve Warranty Consumer Engine Power Source 2 Years Warranty Commercial Engine Power Source 90 Days Gross Horsepower (ft-lbs)* 13.5 Engine Displacement (cc) 500 Engine Configuration Single cylinder, 4-stroke, air cooled, OHV (Overhead Valve) Fuel Tank Capacity (gal) 2.6 (optional) Cylinder Type Cast Iron Sleeve Warranty Consumer Engine Power Source 2 Years Warranty Commercial Engine Power Source 1 Year Gross Horsepower (ft-lbs)* 15.5 Engine Displacement (cc) 500 Engine Configuration Single cylinder, 4-stroke, air cooled, OHV (Overhead Valve) Fuel Tank Capacity (gal) N/A Cylinder Type Cast Iron Sleeve Warranty Consumer Engine Power Source 2 Years Warranty Commercial Engine Power Source 1 Year Gross Horsepower (ft-lbs)* 11.5 13.5 15.5 Engine Displacement (cc) 344 500 500 Engine Configuration Single cylinder, 4-stroke, air cooled, OHV (Overhead Valve) Single cylinder, 4-stroke, air cooled, OHV (Overhead Valve) Single cylinder, 4-stroke, air cooled, OHV (Overhead Valve) Weight (lbs) 26.8 29.5 29.5 Stroke (in) 57.5 77.8 77.8 Fuel Tank Capacity (gal) 2.6 (optional) 2.6 (optional) N/A Oil Capacity (oz) 1.4 1.4 1.4 Cylinder Type Cast Iron Sleeve Cast Iron Sleeve Cast Iron Sleeve Warranty Consumer Engine Power Source 2 Years 2 Years 2 Years Warranty Commercial Engine Power Source 90 Days 1 Year 1 Year